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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,619	11/25/2003	Yoshio Takeuchi	03715/LH	1085
1933	7590	10/03/2005		
FRISHAUF, HOLTZ, GOODMAN & CHICK, PC 220 5TH AVE FL 16 NEW YORK, NY 10001-7708			EXAMINER LEBRON, JANNELLE M	
			ART UNIT	PAPER NUMBER
			2861	

DATE MAILED: 10/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/723,619	Applicant(s) TAKEUCHI ET AL.	
	Examiner Jannelle M. Lebron	Art Unit 2861	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 November 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 15-17 is/are rejected.
- 7) ☒ Claim(s) 12-14 and 18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 03-22-2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the fourth paragraph of 35 U.S.C. 112:

Subject to the following paragraph, a claim in dependent form shall contain a reference to a claim previously set forth and then specify a further limitation of the subject matter claimed. A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers.

2. Claims 15 and 16 are rejected under 35 U.S.C. 112, fourth paragraph as being of improper dependent form for failing to further limit the subject matter of a previous claim. The claim limitations are directed toward the type of ink used and do not limit the structure of the claimed "inkjet recording head".

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

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2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
5. Claims 1-7 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Temple.
6. Temple discloses "an inkjet recording head for ejecting ink [10] , comprising:
a plurality of sidewalls [16] to form a plurality of ink channels [12] separated by the plurality of sidewalls, the plurality of sidewalls comprising at least partially a piezoelectric material [column 3, lines 20-22];
a bottom plate [14] to form a bottom face of the plurality of ink channels, the bottom plate comprising a piezoelectric material [column 3, lines 8-10]; and
a plurality of electrodes [24] formed on the plurality of side walls, for being applied an electric voltage to cause pressure change deformation of the plurality of ink channels by shear sidewalls, and to eject the plurality of ink in the plurality of ink channels [column 4, lines 21-26] ;
wherein all of the plurality of ink channels are divided into two or more groups of ink channels, where a group of ink channels is composed of ink channels between which at least one of the plurality of ink channels is sandwiched [column 3, lines 67-68 – column 4, lines 1-2];
- Thus Temple meets the claimed limitations except "wherein an ink ejection operation is performed successively in a time-sharing mode for each of the group of ink channels, while satisfying the condition of

$$|CTC + CTE| \leq 10 (\%);$$

where a crosstalk between channels due to channels in one group of a compliance ratio of the plurality of sidewalls to the ink in the plurality of ink channel is CTC; and a crosstalk between ink channels in one group of ink channels due to a leak of electric field caused by electric voltage applied the plurality of electrodes is CTE."

7. The Temple reference discloses the need to minimize crosstalk [column 3, lines 67-68 – column 4, lines 1-2]. It would have been obvious to one of ordinary skill in the art at the time of the invention to optimize the inkjet recording head of Temple by minimizing the crosstalk; including to the claimed range. One would have been motivated to modify Temple to improve print quality.

8. Regarding claim 2, Temple discloses an inkjet recording head "wherein each of the plurality of sidewalls comprises two layers of piezoelectric material laminated via a contact face, each of the two layers being polarized different with each other in the direction perpendicular to the contact face [column 3, lines 23-29]."

9. Regarding claim 3, Temple discloses an inkjet recording head "wherein the plurality of electrodes are present in a range of least $a/2$ high from the bottom face of the plurality of ink channels, where an ink flow path width of each of the plurality of ink channels is a [as shown in figure 2]."

10. Regarding claim 4, Temple discloses inkjet recording head of claim 1, wherein the plurality of the electrodes are formed by means of a plating method [column 4, lines 33-37]."

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11. Regarding claim 5, Temple discloses the claimed limitations except for “wherein each of the plurality of ink channels has an flow path width of not greater than 100 μm , and ink channel depth of not greater than 300 μm .” It would have been obvious to one of ordinary skill in the art at the time the invention was made to create an ink channel flow path width and depth not greater than 100 μm and 300 μm respectively, for the purpose of utilizing an optimum range. The applicant should note that it has been held that where the general working conditions of a claim of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

12. Regarding claim 6 and 7, Temple discloses an inkjet recording head “wherein the plurality ink channels [12] are formed of:

a substrate [14], on which a plurality of grooves are formed [as shown in figure 2], the grooves being separated by the plurality of sidewalls [16] comprising at least partially a piezoelectric material; and

a cover plate [20] adhered to the top face of the plurality of sidewalls;

Thus Temple meets the claimed limitations except for “wherein the thickness of piezoelectric material at the bottom face of each of the plurality of ink channels is at least 10 μm .” It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a piezoelectric material of more than 10 μm in thickness for the purpose of utilizing an optimum range. The applicant should note that it has been held that where the general working conditions of a claim of a claim are disclosed

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in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

13. Regarding claim 17, Temple discloses an inkjet recording head "wherein all of the plurality of ink channels are divided into three groups of ink channels, where a group of ink channels is composed of ink channels between which two of the plurality of ink channels is sandwiched [column 4, lines 63-68 – column 4, lines 1-2]."

14. Claims 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Temple as applied to claims 1 and 7 above, and further in view of Richtsmeier (US Patent 6,059,406).

15. Temple meets the claimed limitations except "wherein density of the plurality of ink channels is at least 150 dpi" and "wherein the density of the plurality of channels is at least 300 dpi."

16. Richtsmeier teaches a printhead that "achieves receptacle color print quality on plain paper media, even using a print resolution of 300 dots per inch [column 4, lines 49-52]." It would have been obvious to one of ordinary skill in the art at the time of the invention to provide an ink cartridge with a print resolution of at least 300 dpi. One would have been motivated to modify Temple to improve print quality as taught by Richtsmeier.

17. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Temple as applied to claim 1 above, and further in view of Richtsmeier (US Patent 6,059,406).

18. Temple meets the claimed limitations except "wherein the ink is a water-based ink."

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19. Richtsmeier teach ink cartridges that "hold a supply of water-based inks, to which color dyes have been added [column 4, lines 62-63]." It would have been obvious to one of ordinary skill in the art at the time of the invention to provide an ink cartridge that ejects water-based ink. One would have been motivated to modify Temple to improve ink flow as taught by Richtsmeier.

Allowable Subject Matter

20. Claims 12-14 and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

21. The following is a statement of reasons for the indication of allowable subject matter:

22. Prior art does not disclose or suggest the relationship set forth in claims 12-14.

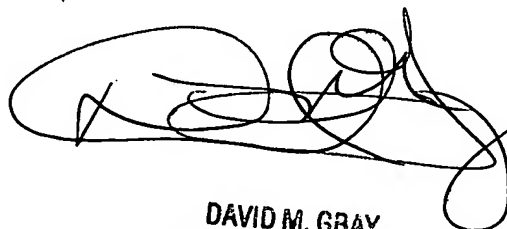
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jannelle M. Lebron whose telephone number is (571) 272-2729. The examiner can normally be reached on Monday thru Friday 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David M. Gray can be reached on (571) 272-2119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JML



DAVID M. GRAY
PRIMARY EXAMINER